

**CLAIMS:**

- 1 1. A printed circuit board, comprising:
    - 2 a plurality of conductive layers, wherein one of said plurality of conductive layers
    - 3 is a first layer, wherein one of said plurality of conductive layers is a second layer;
    - 4 two or more vias interconnecting two or more conductive layers of said plurality
    - 5 of conductive layers, wherein a first of said two or more vias is part of a signal path
    - 6 configured to carry a signal from said first layer to said second layer, wherein a second
    - 7 of said two or more vias is part of a reference path configured to carry said signal from
    - 8 a third layer to a fourth conductive layer, wherein said fourth conductive layer returning
    - 9 said signal to a source; and
  - 10 an electrical component embedded in said second of said two or more vias
  - 11 between two conductive layers of said plurality of conductive layers.
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- 1 2. The printed circuit board as recited in claim 1, wherein said electrical
  - 2 component is a capacitor.
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- 1 3. The printed circuit board as recited in claim 1, wherein said second of said
  - 2 two or more vias is a via adjacent to said first via of said two or more vias.
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- 1 4. The printed circuit board as recited in claim 1, wherein said electrical
  - 2 component has a cylindrical configuration.
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- 1 5. The printed circuit board as recited in claim 1, wherein a diameter from one
  - 2 end of said electrical component changes to an other end of said electrical component,
  - 3 wherein said second via of said two or more vias is configured so that one end of said
  - 4 second via of said two or more vias changes in diameter to an other end of said
  - 5 second via of said two or more vias.

1   6.     The printed circuit board as recited in claim 5, wherein said electrical  
2   component is embedded between the two conductive layers of said plurality of  
3   conductive layers within said printed circuit board by adjusting the diameter of said  
4   electrical component and the diameter of said second via of said two or more vias.

1   7.     The printed circuit board as recited in claim 1, wherein said electrical  
2   component has a greater diameter in a center than at ends of said electrical  
3   component, wherein each end of said electrical component has a conductive cap  
4   which is tinned.

1   8.     The printed circuit as recited in claim 1, wherein said electrical component is  
2   packaged as a pin, wherein each end of said electrical component is soldered to said  
3   two conductive layers of said plurality of conductive layers within said printed circuit  
4   board.

1   9.     The printed circuit as recited in claim 1, wherein said second layer is  
2   configured to carry said signal to a load, wherein said third layer is configured to  
3   return said signal from said load.

- 1 10. A printed circuit board, comprising:
  - 2 a plurality of conductive layers;
  - 3 two or more vias interconnecting two or more conductive layers of said plurality
  - 4 of conductive layers; and
  - 5 an electrical component embedded in a particular via between two conductive
  - 6 layers of said plurality of conductive layers.
  
- 1 11. The printed circuit board as recited in claim 10, wherein said electrical
- 2 component is a two terminal electrical component.
  
- 1 12. The printed circuit board as recited in claim 10, wherein said electrical
- 2 component is a capacitor.
  
- 1 13. The printed circuit board as recited in claim 10, wherein said electrical
- 2 component is a resistor.
  
- 1 14. The printed circuit board as recited in claim 10, wherein said electrical
- 2 component is an inductor.
  
- 1 15. The printed circuit board as recited in claim 10, wherein said electrical
- 2 component is a diode.
  
- 1 16. The printed circuit board as recited in claim 10, wherein said electrical
- 2 component has a cylindrical configuration.
  
- 1 17. The printed circuit board as recited in claim 10, wherein a diameter from one
- 2 end of said electrical component changes to an other end of said electrical component,
- 3 wherein said particular via is configured so that one end of said particular via changes
- 4 in diameter to an other end of said particular via.

1    18.    The printed circuit board as recited in claim 17, wherein said electrical  
2    component is embedded between two conductive layers of said plurality of  
3    conductive layers by adjusting the diameter of said electrical component and the  
4    diameter of said particular via.

1    19.    The printed circuit board as recited in claim 10, wherein said electrical  
2    component has a greater diameter in a center than at ends of said electrical  
3    component, wherein each end of said electrical component has a conductive cap  
4    which is tinned.

1    20.    The printed circuit as recited in claim 10, wherein said electrical component is  
2    packaged as a pin, wherein each end of said electrical component is soldered to said  
3    two conductive layers of said plurality of conductive layers.

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1 21. A method for reducing impedance within a reference path in a printed circuit  
2 board comprising the steps of:

3 forming said printed circuit board comprising a plurality of conductive layers,  
4 wherein one of said plurality of conductive layers is a first layer, wherein one of said  
5 plurality of conductive layers is a second layer, wherein said printed circuit board further  
6 comprises two or more vias interconnecting two or more conductive layers of said  
7 plurality of conductive layers, wherein a first of said two or more vias is part of a signal  
8 path configured to carry said signal from said first layer to said second layer, wherein a  
9 second of said two or more vias is part of a reference path configured to carry said signal  
10 from a third layer to a fourth conductive layer; and

11 embedding an electrical component in said second of said two or more vias  
12 between two conductive layers of said plurality of conductive.

1 22. The method as recited in claim 21, wherein said electrical component is a  
2 capacitor.

1 23. The method as recited in claim 21, wherein said second via of said two or  
2 more vias is a via adjacent to said first via of said two or more vias.

1 24. The method as recited in claim 21, wherein said electrical component has a  
2 cylindrical configuration.

1 25. The method as recited in claim 21, wherein a diameter from one end of said  
2 electrical component changes to an other end of said electrical component, wherein  
3 said second via of said two or more vias is configured so that one end of said second  
4 via of said two or more vias changes in diameter to an other end of said second via of  
5 said two or more vias.

- 1    26.    The method as recited in claim 25 further comprising the step of:
  - 2                embedding said electrical component between two conductive layers of said
  - 3                plurality of conductive layers within said printed circuit board by adjusting the diameter
  - 4                of said electrical component and the diameter of said second via of said two or more vias.
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- 1    27.    The method as recited in claim 21, wherein said electrical component has a greater diameter in a center than at ends of said electrical component, wherein each end of said electrical component has a conductive cap which is tinned.
- 1    28.    The method as recited in claim 21, wherein said electrical component is packaged as a pin, wherein each end of said electrical component is soldered to said two conductive layers of said plurality of conductive layers within said printed circuit board.
- 1    29.    The method as recited in claim 21, wherein said second layer is configured to carry said signal to a load, wherein said third layer is configured to return said signal from said load.

- 1 30. A method for saving space in a printed circuit board comprising the steps of:
  - 2 forming said printed circuit board comprising a plurality of conductive layers,
  - 3 wherein said printed circuit board further comprises two or more vias interconnecting
  - 4 two or more conductive layers of said plurality of conductive layers; and
  - 5 embedding an electrical component in a particular via between two conductive
  - 6 layers of said plurality of conductive layers.
- 1 31. The method as recited in claim 30, wherein said electrical component is a two  
2 terminal electrical component.
- 1 32. The method as recited in claim 30, wherein said electrical component is a  
2 capacitor.
- 1 33. The method as recited in claim 30, wherein said electrical component is a  
2 resistor.
- 1 34. The method as recited in claim 30, wherein said electrical component is an  
2 inductor.
- 1 35. The method as recited in claim 30, wherein said electrical component is a  
2 diode.
- 1 36. The method as recited in claim 30, wherein said electrical component has a  
2 cylindrical configuration.
- 1 37. The method as recited in claim 30, wherein a diameter from one end of said  
2 electrical component changes to an other end of said electrical component, wherein  
3 said particular via is configured so that one end of said particular via changes in  
4 diameter to an other end of said particular via.

1 38. The method as recited in claim 37, wherein said electrical component is  
2 embedded between two conductive layers of said plurality of conductive layers by  
3 adjusting the diameter of said electrical component and the diameter of said particular  
4 via.

1 39. The method as recited in claim 30, wherein said electrical component has a  
2 greater diameter in a center than at ends of said electrical component, wherein each  
3 end of said electrical component has a conductive cap which is tinned.

1 40. The method as recited in claim 30, wherein said electrical component is  
2 packaged as a pin, wherein each end of said electrical component is soldered to said  
3 two conductive layers of said plurality of conductive layers.